New Technologies for Weather Information Communication WxAP Project Review 2005

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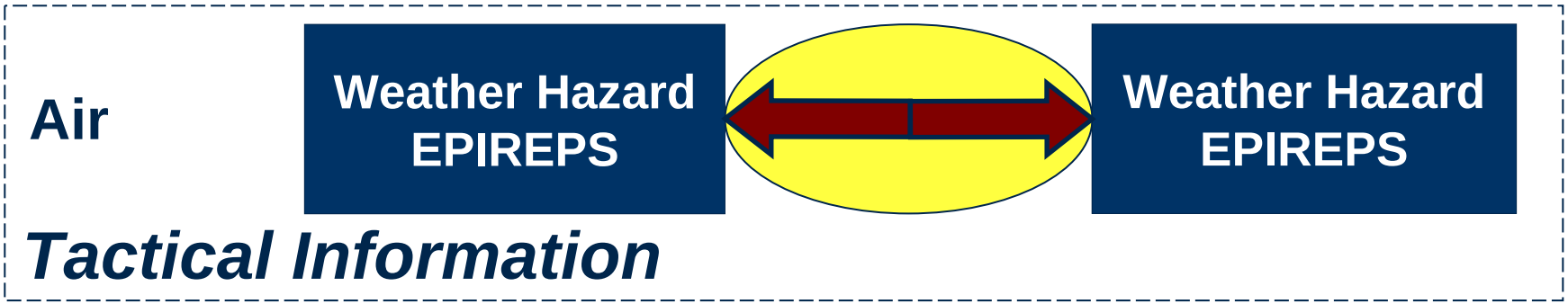
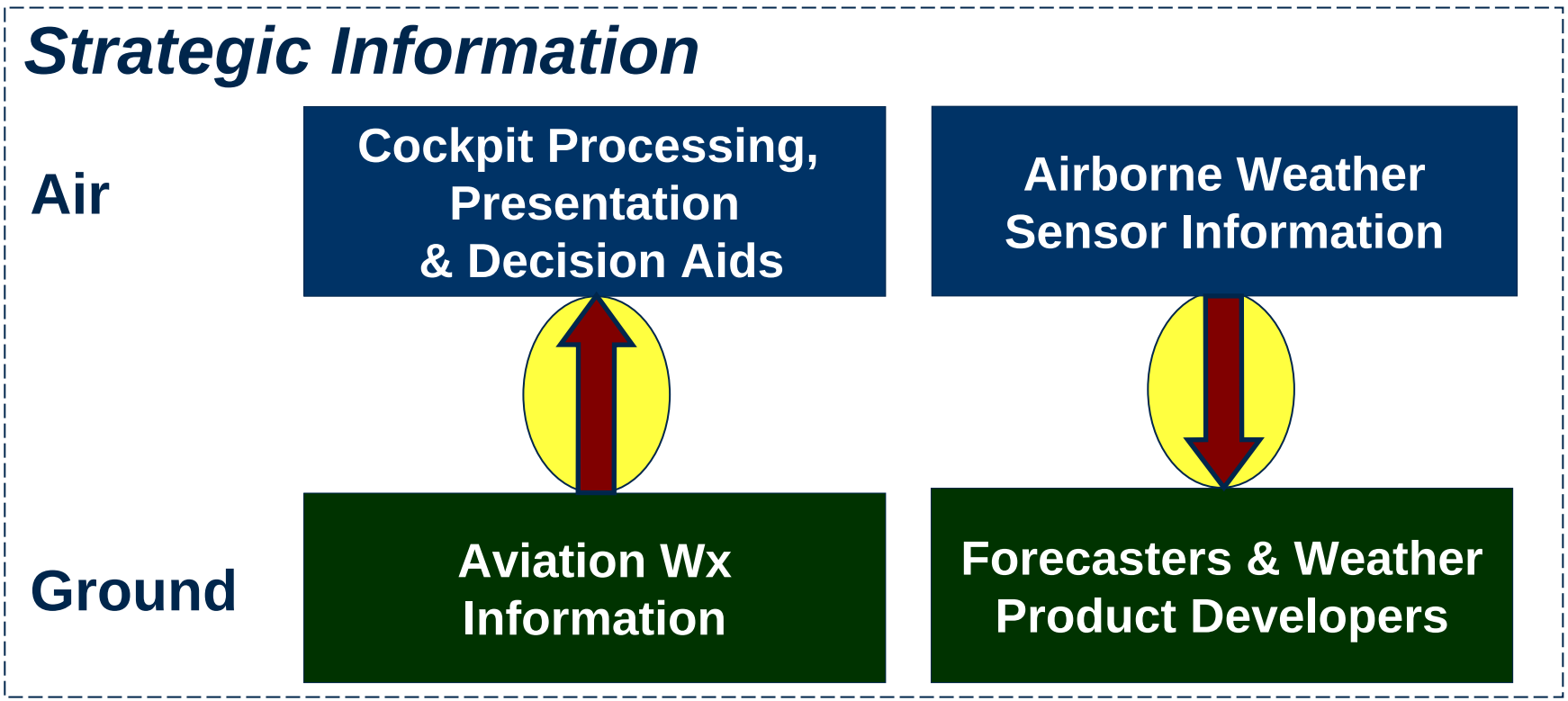
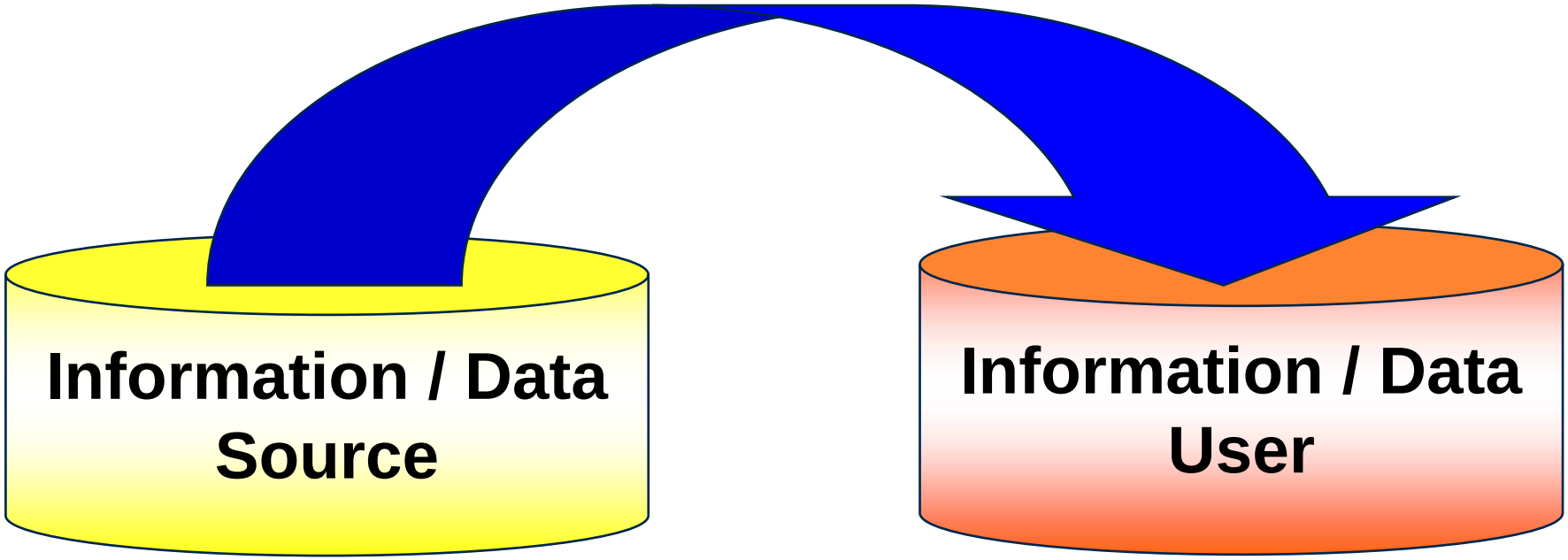
WINCOMM Goals





Communications 101



Weather Products	→	Aircraft Pilots
TAMDAR Data	→	Aircraft Pilots
TAMDAR Data	→	Forecasters
TAMDAR Data	→	Product Generation
Weather Data	→	Aircraft Decision Aides
Weather Data	→	Aircraft Control Systems

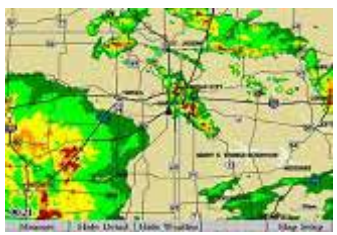
Aircraft Decision Aiding

Air

Information Barrier

Data Link Solutions

Ground



Aviation Weather Products

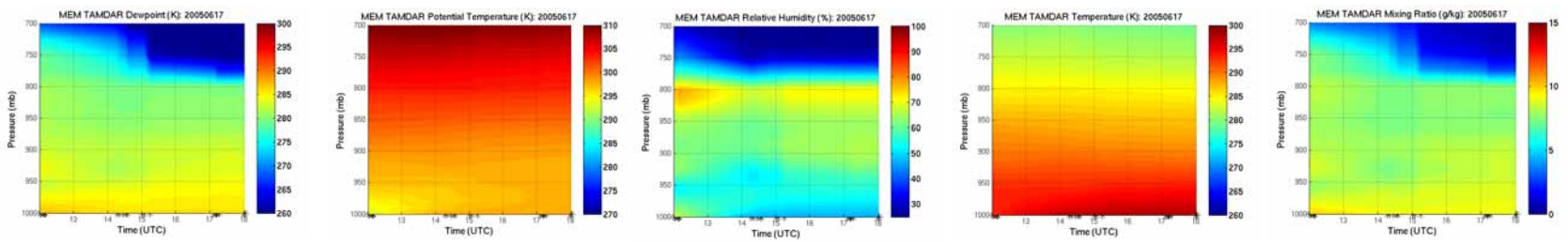
Aircraft-Based Atmospheric Sensors

Air

Ground

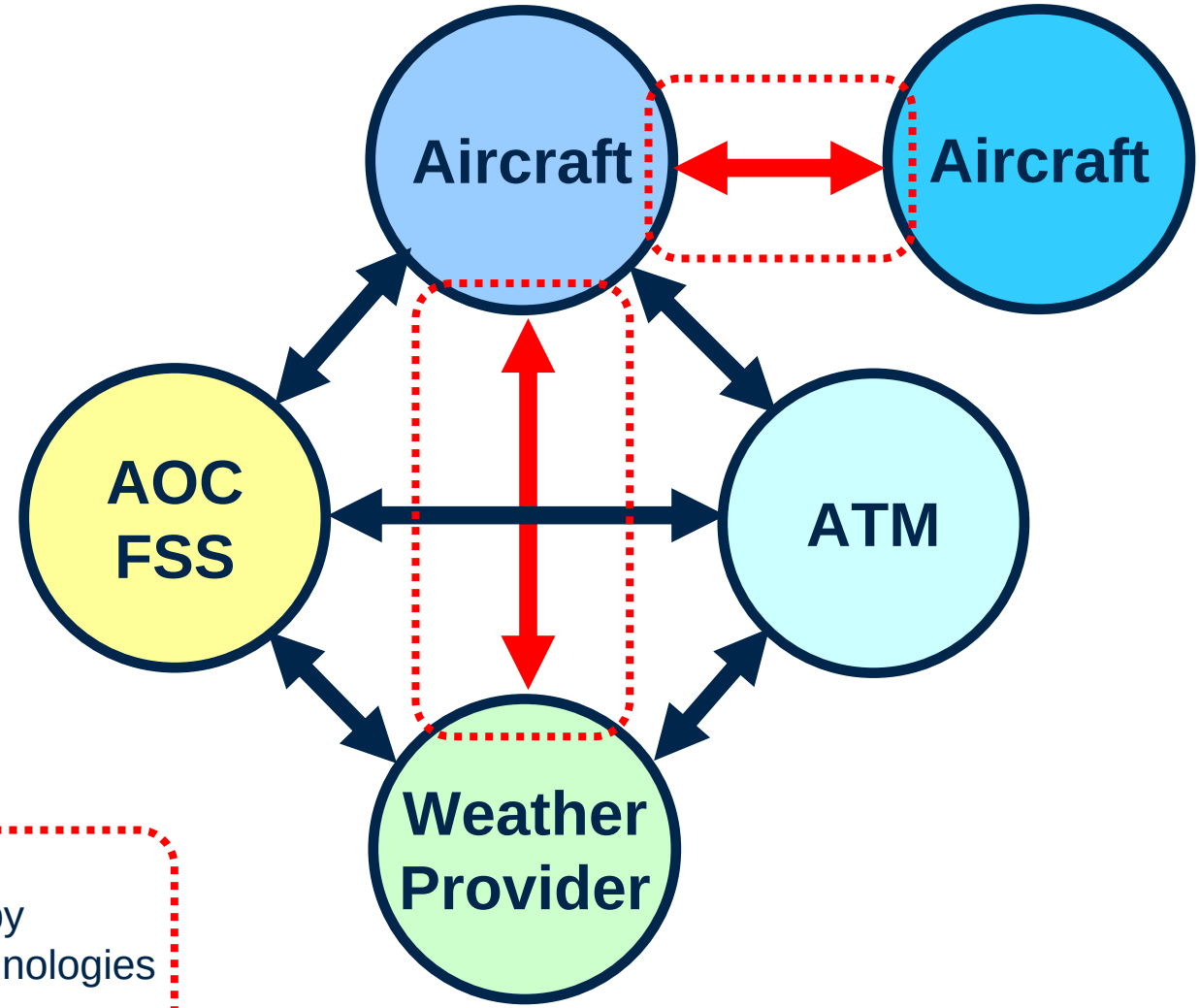
Information Barrier

Data Link Solutions



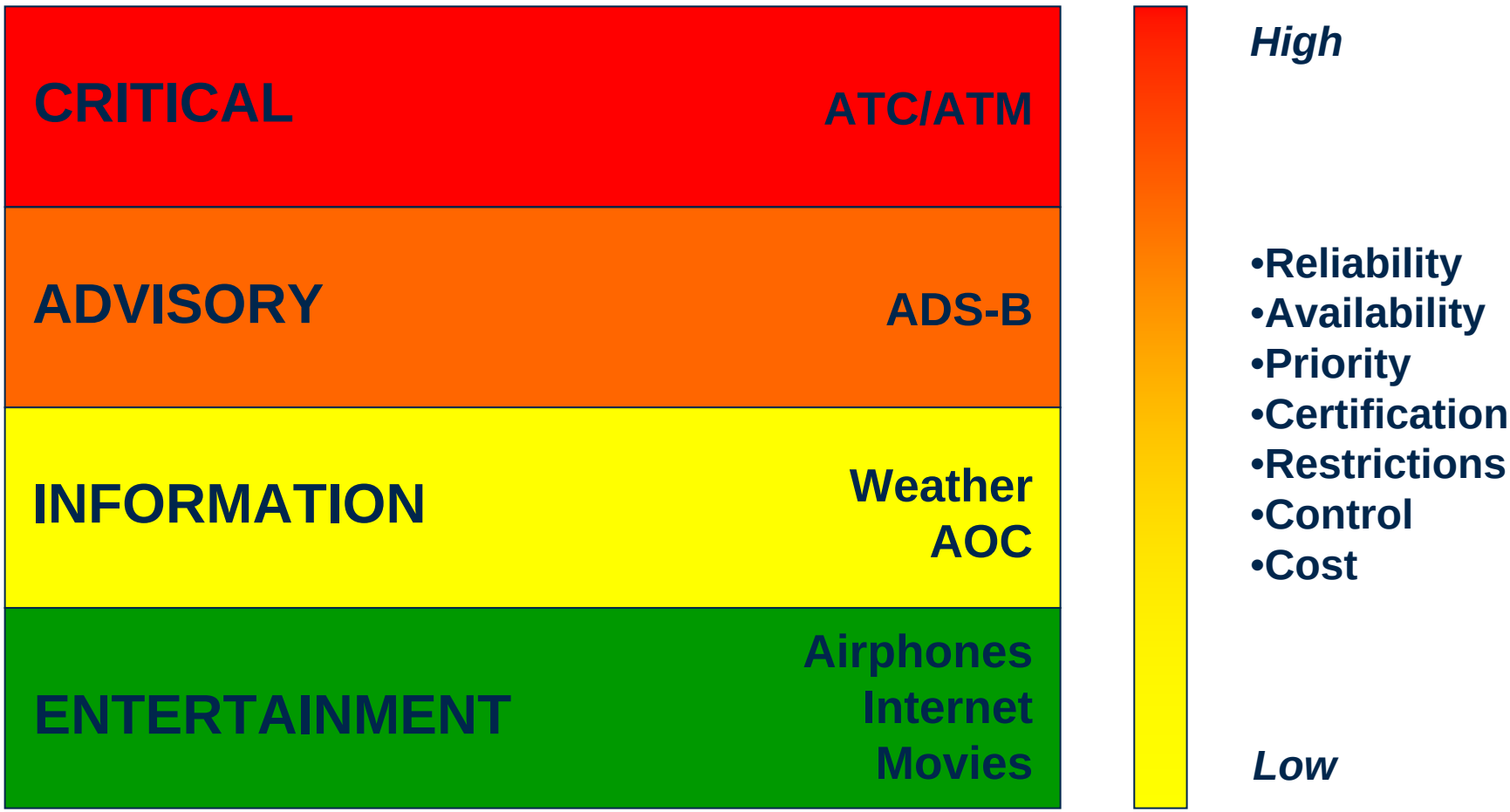
Atmospheric Data

Weather Information Exchange

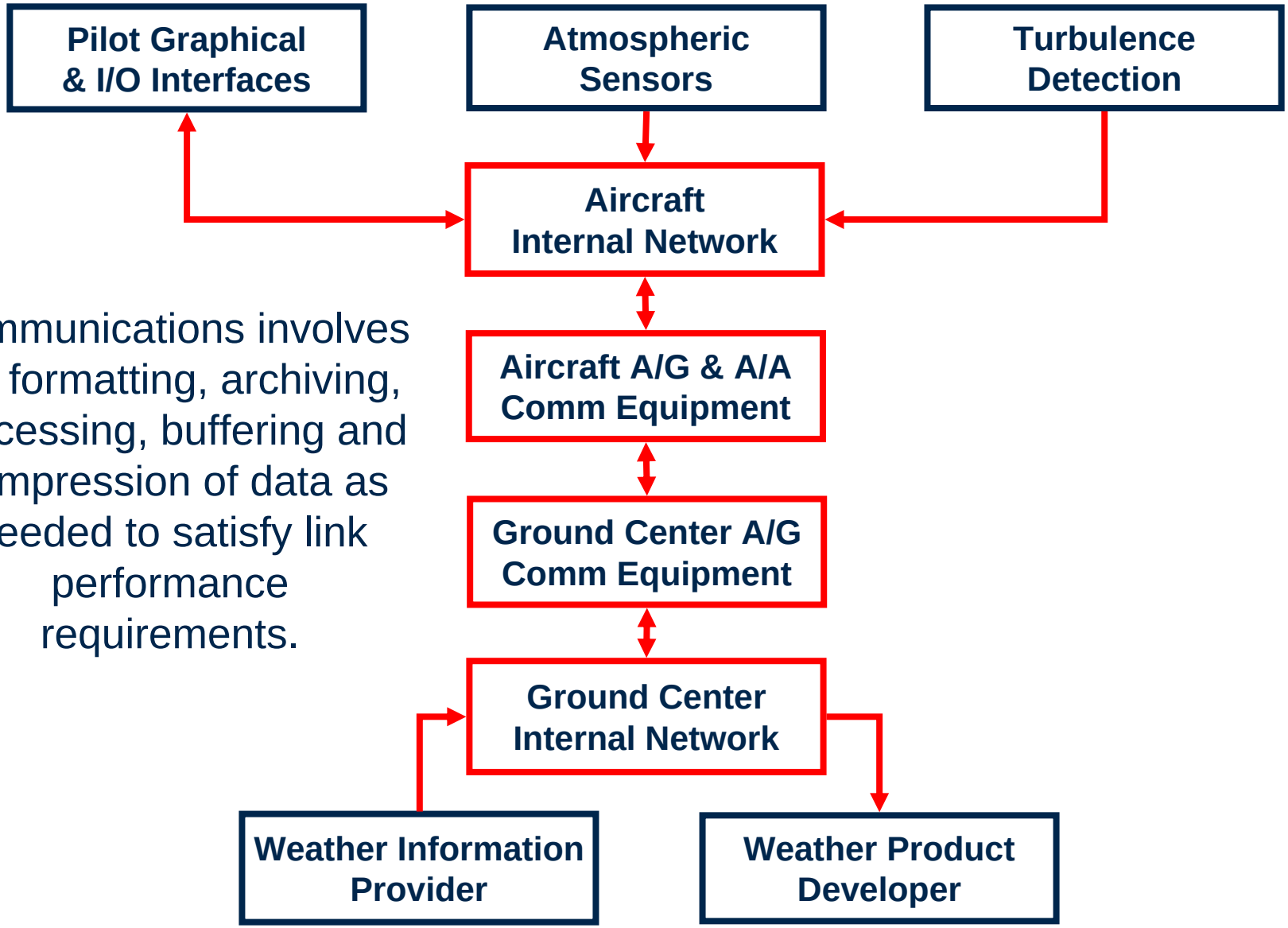


Enabled by
WINCOMM Technologies

Aircraft Communications



Weather Information Communications



Communications involves the formatting, archiving, processing, buffering and compression of data as needed to satisfy link performance requirements.

AvSSP – FY05 Technical Accomplishment
General Aviation Weather Dissemination Technologies

Close Formation Flight before Execution of Maximum Separation Maneuver of ~100 nm
[Lear Jet 23 as seen from the Lear Jet 25]

Lear Jet 25 over Ohio During Air-Air Testing

Air to Air & Air to Ground

- ➢Weather Hazard Encounters
  - ✓Turbulence, Icing
- ➢Atmospheric Conditions
  - ✓TAMDAR Sensor

On-Board Routing & Display

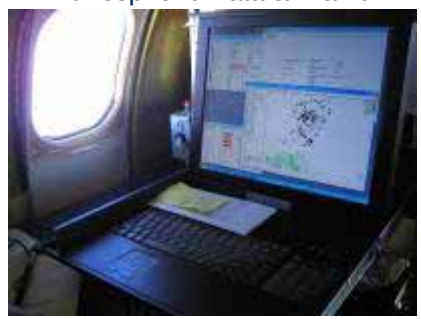
- ➢Own-Ship & From Other Aircraft
  - ✓Weather Hazard Encounters
  - ✓Atmospheric Conditions
- ➢From the Ground
  - ✓Weather Products

Ground to Air

- ➢Aviation Weather Products
  - ✓Textual
  - ✓Graphical

ADS-B Services (UAT)

Avionics Test Configuration on Lear Jet 25 and Display of Weather Information, Atmospheric Data & Traffic



Cleveland Hopkins International Airport – Ground Station

AvSSP – FY05 Technical Accomplishment
Commercial Transport Weather Dissemination Technologies

Close Formation Flight before Execution of Maximum Separation Maneuver of ~100 nm
[Lear Jet 25 as seen from the Lear Jet 23]

Lear Jet 23 over Ohio During Air-Air Testing

Air to Air & Air to Ground
- Turbulence Encounters

Air to Ground
- Turbulence Encounters
- Pilot Weather Requests

Ground to Air
- Aviation Weather Products
  - ✓Textual
  - ✓Graphical

VDLM3 Flight Path

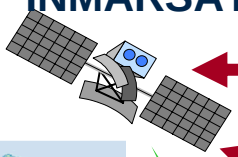
ADS-B Services (1090ES) & VDLM3

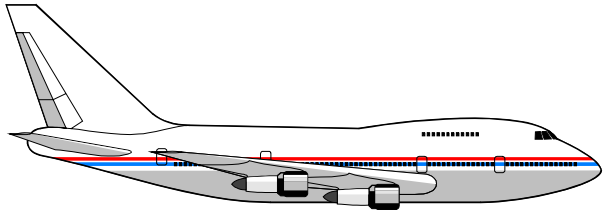
Avionics Test Equipment and Experiment Test Stations on the Lear Jet 25

Lear Jet 25 in the FAA Tech Ctr Hangar

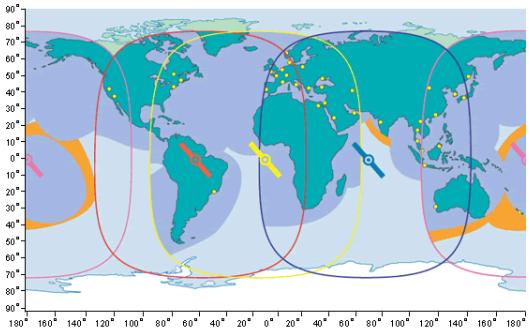
International/Oceanic Dissemination

INMARSAT

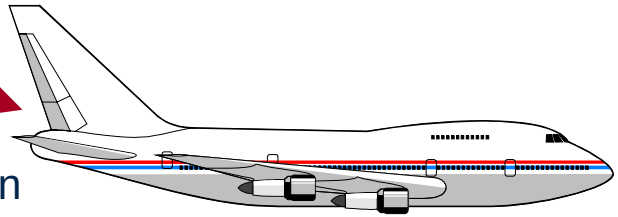




Air to Air (through Ground Station)
- Turbulence Alerts/Warnings



Air to Ground
- Sensor Data
- Turbulence Information
- Aircraft Telemetry



SITA/Swift-64
Service Provider

INMARSAT
Ground Station

Ground to Air
- Graphical Weather Products
- Alerts/Warnings
- ATC Information
- Reports

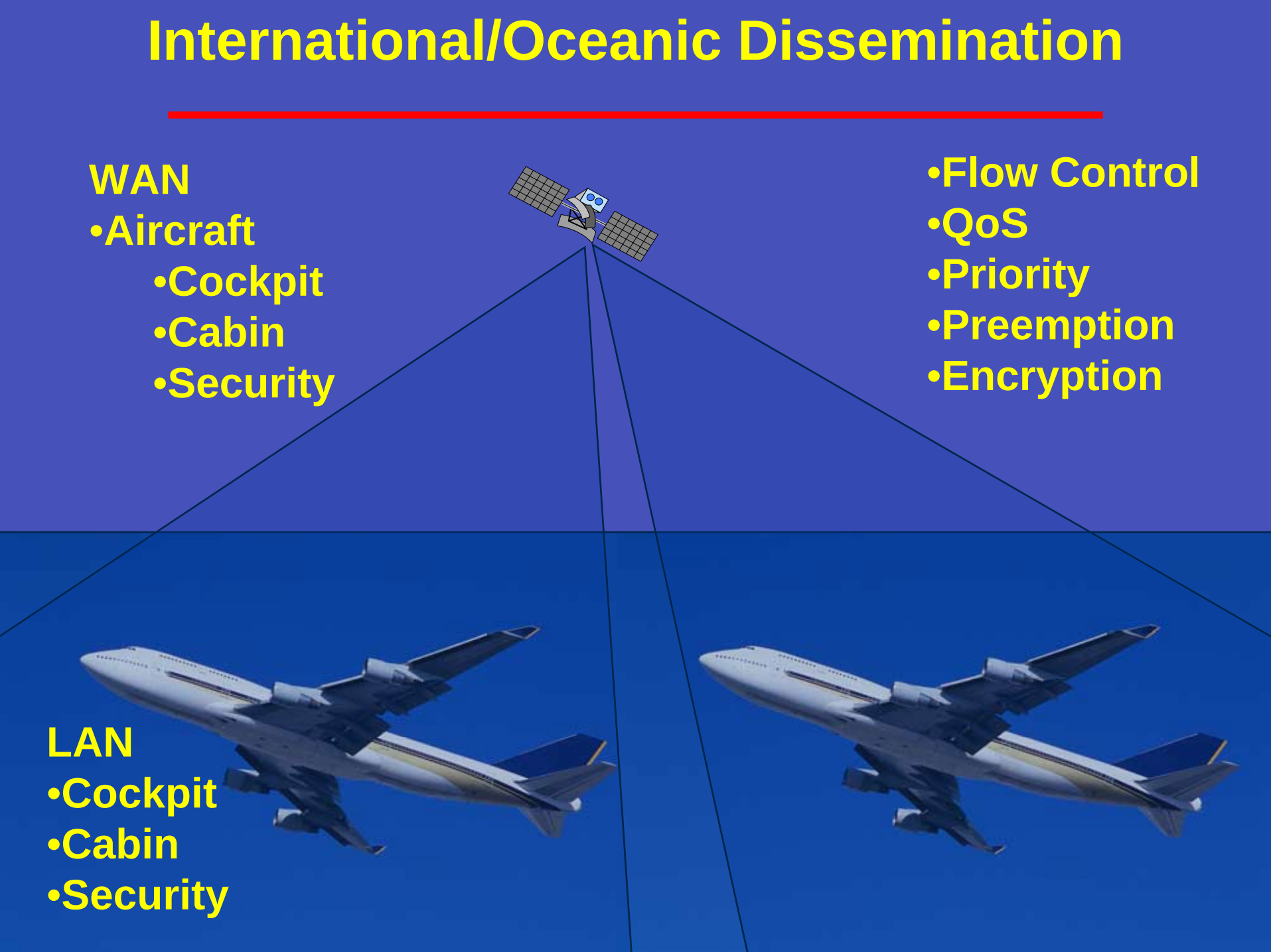
National/Commercial Weather Provider

AOC, Dispatch, ATC

International/Oceanic Dissemination

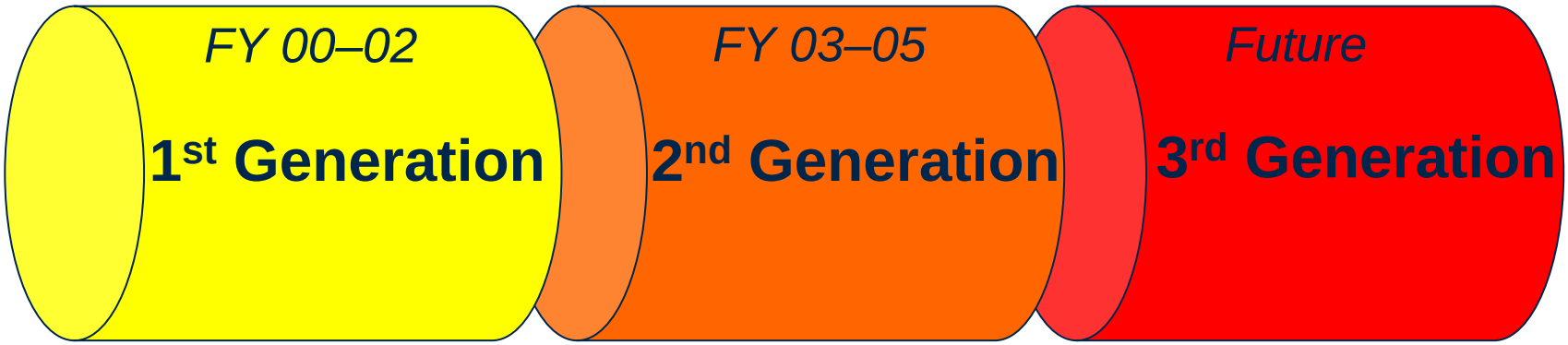
WAN
- Aircraft
  - Cockpit
  - Cabin
  - Security

- Flow Control
- QoS
- Priority
- Preemption
- Encryption



LAN
- Cockpit
- Cabin
- Security

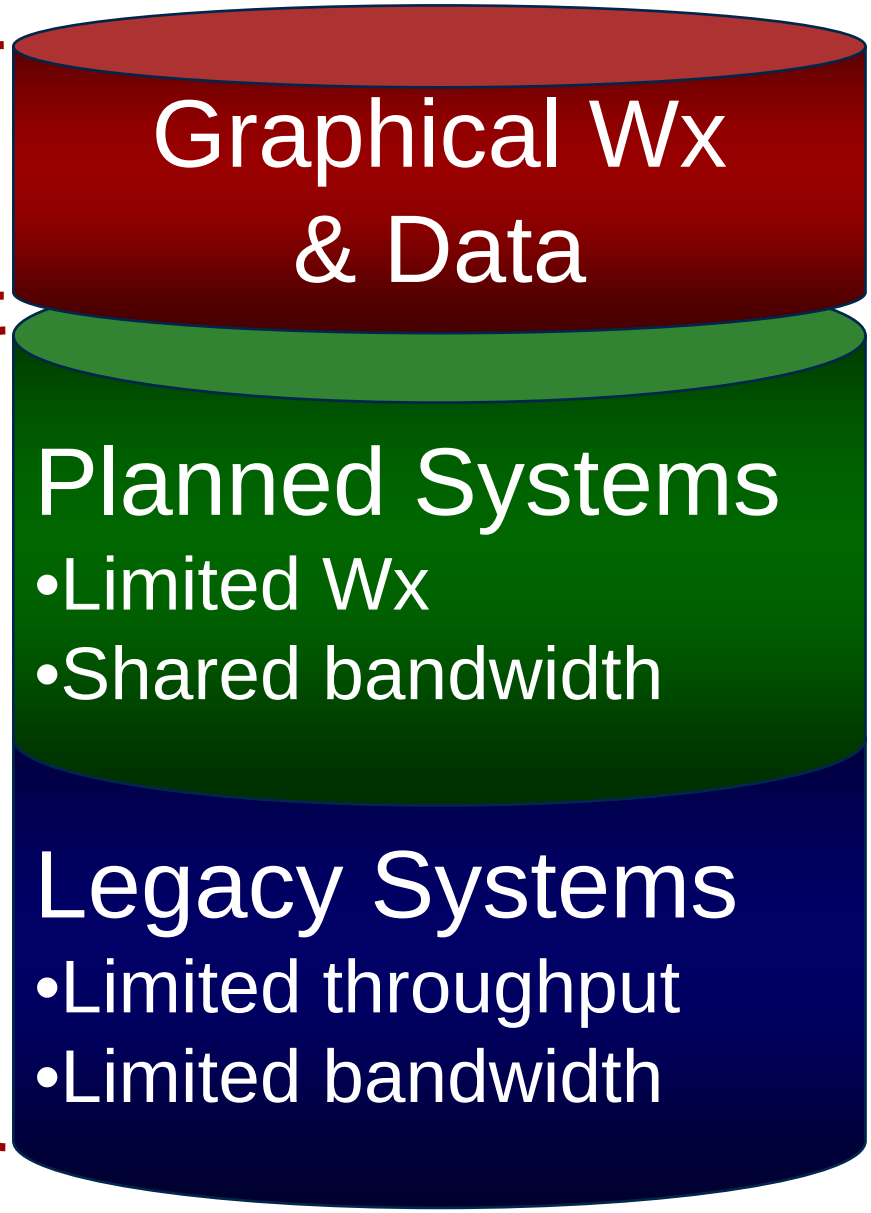
Aviation Data Link Development



1st Generation	2nd Generation	3rd Generation
•G–A Broadcast •Private Networks •Weather (Wx) Only •Limited Capacity •High Relative Cost •GA	•G–A, A–G, A–A •Private Networks •Multi-Aviation Use •Additional Capacity •Increased Value •GA & Com Transport •EPIREPS •A/C Wx Sensors •Dynamic Requests	•Full Mesh Networking •Public Infrastructure •Information Pipeline •Broadband •Low Relative Cost •All Aircraft •Crosslinks •Data Processing •Routing
•FISDL (Terrestrial) **•WSI (Satcom)** **•XM (Satcom DARS)**	**•UAT & VDLM3 (Terrestrial)** **•Swift 64 (Satcom)** **•1090ES (Air-Air)**	**•Aviation Cellular** **•High-Value Satcom**

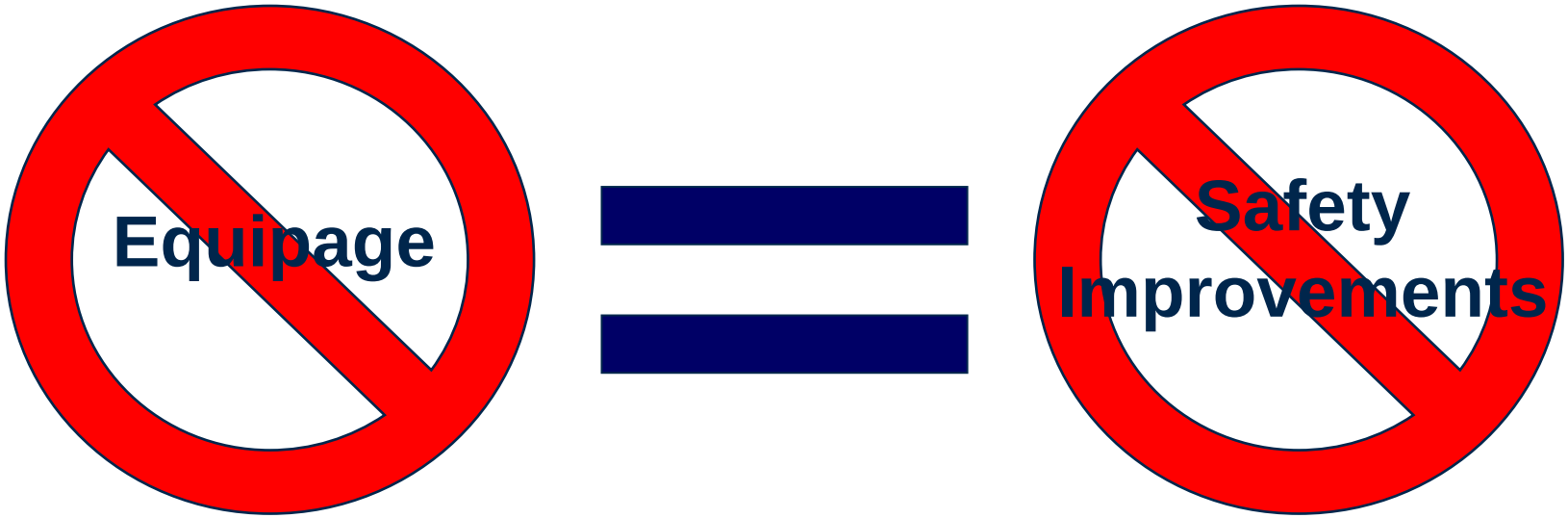
Limited Use of Commercial Spectrum

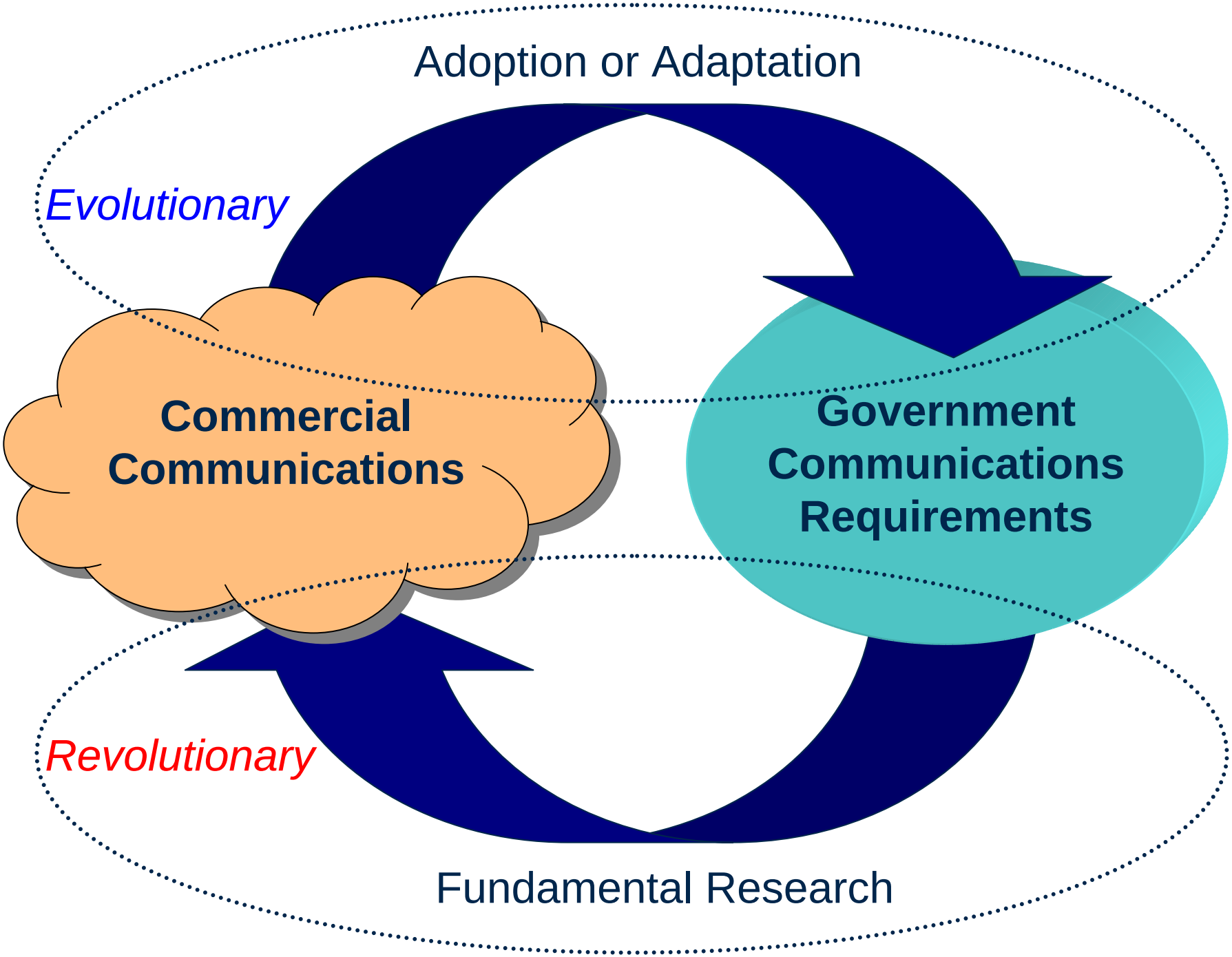
Assigned FAA Spectrum



Reallocation


Maintenance
Operations
Deployment
Infrastructure
Development
Service Cost
Maintenance
Equipment
Service Providers
End Users
Aviation Community


Equipage
Safety
Improvements


Adoption or Adaptation
Evolutionary
Commercial Communications
Government Communications Requirements
Revolutionary
Fundamental Research

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Benefiting Airspace Mobility, Capacity and Flight Safety

[End of Presentation]